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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P17756WO	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE2003/001708	International filing date (<i>day/month/year</i>) 05.11.2003	Priority date (<i>day/month/year</i>) 05.11.2002
International Patent Classification (IPC) or national classification and IPC H04Q 7/38		
Applicant Telefonaktiebolaget LM Ericsson (publ)		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. (*sent to the applicant and to the International Bureau*) a total of 7 sheets, as follows:

sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand 26-04-2004	Date of completion of this report 25-01-2005
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2003/001708

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- international search (under Rules 12.3 and 23.1(b))
- publication of the international application (under Rule 12.4)
- international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):

the international application as originally filed/furnished
 the description:

pages 1-4, 6-13, 15-29 as originally filed/furnished

pages* 5, 14 received by this Authority on 04-10-2004

pages* _____ received by this Authority on _____

the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 30-34 received by this Authority on 11-10-2004

pages* _____ received by this Authority on _____

the drawings:

pages 1-9 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. The amendments have resulted in the cancellation of:

the description, pages _____
 the claims, Nos. _____
 the drawings, sheets/figs _____
 the sequence listing (specify): _____
 any table(s) related to the sequence listing (specify): _____

4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages _____
 the claims, Nos. _____
 the drawings, sheets/figs _____
 the sequence listing (specify): _____
 any table(s) related to the sequence listing (specify): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2003/001708

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims Claims	<u>1-19</u> <u> </u>	YES NO
Inventive step (IS)	Claims Claims	<u>1-19</u> <u> </u>	YES NO
Industrial applicability (IA)	Claims Claims	<u>1-19</u> <u> </u>	YES NO

2. Citations and explanations (Rule 70.7)

The claimed invention address the problem of finding an efficient way for communicating an RNC reset to affected nodes. This is achieved by way of introducing a message which indicates which connections that are to be released, upon detecting a malfunction, so that these connections can return to idle mode.

In the international search report the following documents were cited:

D1 US 2001/034228 A1
D2 US 2002/160785 A1

D1 relates to a system, method, a radio access network and associated network nodes adapted for handling signalling connections upon detecting an error or a failure that effects a user equipment. A message which is sent to affected nodes is indicating which connections that are to be released, and which connections that are to be maintained (See [0018]-[0022] ; [0042]-[0045] ; [0049]).

D2 relates to a system and method for facilitating transmission of additional parameters in a handover command message, without lengthening the handover command message (See [0039]-[0042] ; figure 4).

Document D1, which is considered to represent the most relevant state of the art, discloses one way of notifying a plurality of fixed nodes about a failure which is effecting these nodes, from which the subject-matter of the independent, amended claims 1,7,11,15 and 19 differs in that D1 fails to suggest transmission of messages over the air, i.e. no information is delivered to the user equipment, giving the

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

equipment relevant information to take the decision as to whether the user equipment should return to idle mode or not.

The subject-matter of claim 1-19 is therefore novel (Article 33(2) PCT).

04-10-2004

user equipment unit (UE) can not transport any signalling messages to the network. The URA_PCH state resembles the CELL_PCH state, but primarily differs in that the user equipment unit (UE) only updates the network of its location after crossing UTRAN Routing Area (URA) borders.

5 [00016] In making or attempting to make connection with a user equipment unit operating in a radio access network, a core network typically assigns a core network UE identity (e.g., CN UE identity) to the user equipment unit. But the CN UE identity assigned to a particular user equipment unit may not be a unique CN UE identity when used on a common transport channel to a connected mode UE. Keep in mind that there
10 may be several core networks which are assigning CN UE identities. It may turn out, for example, that an idle mode UE registered in different location and/or routing area may camp in the same cell as with a connected mode UE, with both the idle mode UE and connected mode UE having been assigned the same CN UE identity. The typical scenario when such common assignment may happen is when the connected mode UE
15 camps in a cell controlled by a drift RNC (DRNC). If the DRNC receives a paging message from a CN node, intended to the idle mode UE, it should be able to use the CN UE identity as the identity when paging the idle mode UE without a risk that the connected mode UE may respond to the page.

20 [00017] In order to avoid such confusion, an RNC which receives a page from the core network handles the page differently depending on whether the RNC has an established RRC connection the given UE or not. For example, if the UE to be paged is in connected mode, the connected mode UE is addressed for paging purposes using the U-RNTI (described above). On the other hand, if the UE to be paged is in idle mode, the
25 idle mode UE is addressed for paging purposes using the CN UE identity assigned to the idle mode UE.

[00018] An RNC generally has interfaces to base stations, interfaces to other RNCs, diversity handover functionality, and other components and functional units employed, e.g., in conjunction with the radio resource control protocol. Various functionalities of the RNC are performed by several processors which are running (executing) different processes and/or handling different RRC connections. Typically, the control of the UE
30 connections owned by the RNC is shared or partitioned among the processors, so that

of the reset (e.g., reset message 102) for transmission between control nodes of the radio access network, e.g., between control node 26₁ and control node 26₂.

[00053] As shown in Fig. 1, the reset message generator 100 includes subset reset element formatter 110 which prepares, for inclusion in reset message 102, an element 5 which collectively indicates that a subset of the connections (i.e., not all of the connections) controlled by the control node 26₁ are to be released. The element, hereinafter also referred to as the subset reset element, thus specifies a subset of the connections controlled by control node 26₁ that are to be released. The terms "subset" and "group" are utilized interchangeably herein, both terms referring to plural 10 connections but less than all connections controlled by a control node such as control node 26₁.

[00054] Inclusion in the message 102 of the subset reset element facilitates return to an idle mode of the user equipment units involved in the subset of the connections. Return to the idle mode renders the user equipment units better amenable to paging requests. 15 By virtue of inclusion of the subset reset element, the message 102 need not go to one extreme of listing individually each of the connections affected by the reset, nor to another extreme of specifying all connections controlled by the control node.

[00055] Fig. 1 illustrates that control node 26₂ includes a reset response unit 120 which represents functionality for responding to the reset message 102. The reset message 20 102 includes the subset reset element which collectively indicates or specifies that a subset of the connection (connection subset or group of connections) controlled by the control node 26₁ are to be released. As explained subsequently in more detail in an illustrative example implementation, upon receipt of the reset message 102 the reset response unit 120 prepares and sends one or more types of connection release messages 25 to base stations in cells for which control node 26₂ controls radio resources. For example, the reset response unit 120 sends connection release message 122₁ to base station 28₂₋₁ and connection release message 122₂ to base station 28₂₋₂. As illustrated in Fig. 1, the connection release message 122 are merely representative messages. In addition, upon successful transmission of the connection release message 122, the reset 30 response unit 120 of control node 26₂ returns a reset response message 130 to control node 26₁.

WHAT IS CLAIMED IS:

1. A node (26₁ or 26₂) of a radio access network of a telecommunications system which prepares a message for transmission to at least one other node of the radio access network, the message resulting from occurrence of a reset procedure (104) affecting a control node which controls connections with user equipment units (30) in a connected mode, the message including an element which collectively indicates that a subset of the connections are to be released so that the user equipment units (30) involved in the subset of the connections can return to an idle mode, the element being recognizable when included in a further message received over an air interface by a user equipment unit having a connection in the subset whereby the user equipment unit can determine if it is to return to the idle mode.
2. The node of claim 1, wherein the node which prepares the message is a radio network control node (26₁) which controls the connections.
3. The node of claim 1, wherein the node performs plural processes with each of the plural processes handling a respective one of plural subsets of connections with user equipment units (30) in the connected mode, and wherein when the reset procedure (104) affects a specific one of the plural processes, an element corresponding to the respective one of the plural subsets of connections handled by the specific one of the plural processes is included in the message.
4. The node of claim 1, wherein the element comprises a group identity for the subset of connections; wherein the group identity comprises a group value and a group bit mask index, wherein the group bit mask index indicates bits of the group value which are common for all connections of the subset of connections; and wherein the group value is a group S-RNTI and the group bit mask index indicates the bits of the group S-RNTI which are common for all connections of the subset of connections.
5. The node of claim 1, wherein the further message is prepared by a drift radio network control node (26₂) which provides radio resources for the connections handled by a serving radio network control node (26₁).

6. The node of claim 5, wherein in the further message the element comprises a group identity for the subset of connections; wherein the group identity comprises a group value, and a group bit mask index, wherein the group bit mask index indicates bits of the group value which are common for all connections of the subset of connections; and wherein the group value is a group U-RNTI and the group bit mask index indicates the bits of the U-RNTI value which are common for all connections of the subset of connections.

7. A radio access network of a telecommunications system comprising:
10 a serving control node (26₁) which controls connections with user equipment units (30) in a connected mode;

at least one drift control node (26₂) which provides radio resources in cells controlled by the at least one drift control node (26₂) for some of the connections handled by the serving control node (26₁);

15 wherein the serving control node (26₁) sends a message for transmission to the at least one drift control node (26₂) of the radio access network, the message resulting from occurrence of a reset procedure (104) affecting the serving control node (26₁), the message including an element which collectively indicates that a subset of the connections are to be released so that the user equipment units (30) involved in the subset of the connections can return to an idle mode, the element being recognizable
20 when included in a further message received over an air interface by a user equipment unit having a connection in the subset whereby the user equipment unit can determine if it is to return to the idle mode.

8. The network of claim 7, wherein the at least one drift control node (26₂) is arranged, upon receipt of the message, to send a response message to the serving control node (26₁).

9. The network of claim 7, wherein the at least one drift control node (26₂) sends the further message via a base station (28) controlled by the at least one drift control node (26₂), the further message including a further element, the further element being derived from the element included in the message.

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30 10. The network of claim 9, wherein the further element comprises a group identity for the subset of connections; wherein the group identity comprises a control

node identifier indicative of the serving control node, a group value, a group bit mask index, and wherein the group bit mask index indicates bits of the group value which are common for all connections of the subset of connections; and wherein the group value is a group U-RNTI and the group bit mask index indicates the bits of the U-RNTI value which are common for all connections of the subset of connections.

11. A method of operating a node (26₁ or 26₂) of a radio access network of a telecommunications system which prepares a message for transmission to at least one other node of the radio access network, the message resulting from occurrence of a reset procedure (104) affecting a control node which controls connections with user equipment units (30) in a connected mode, the method comprising including in the message an element which collectively indicates that a subset of the connections are to be released so that the user equipment units (30) involved in the subset of the connections can return to an idle mode, the element being recognizable when included in a further message received over an air interface by a user equipment unit having a connection in the subset whereby the user equipment unit can determine if it is to return to the idle mode.

12. The method of claim 11, further comprising using a radio network control node (26₁) which controls the connections to prepare the message.

13. The method of claim 11, further comprising:
20 performing at the node plural processes with each of the plural processes handling a respective one of plural subsets of connections with user equipment units (30) in the connected mode;
when the reset procedure (104) affects a specific one of the plural processes, including in the message an element corresponding to the respective one of the plural 25 subsets of connections handled by the specific one of the plural processes.

14. The method of claim 11, further comprising using a drift radio network control node (26₂) which provides radio resources for the connections handled by a serving radio network control node (26₁) to prepare the further message.

15. A method of operating a radio access network of a telecommunications 30 system which includes a serving control node (26₁) and at least one drift control node

(26₂), the serving control node (26₁) handling connections with user equipment units (30) in a connected mode, the at least one drift control node (26₂) providing radio resources in cells controlled by the at least one drift control node (26₂) for some of the connections handled by the serving control node (26₁), the method comprising:

- 5 performing a reset procedure (104) at the serving control node;
sending from the serving control node (26₁) to the at least one drift control node (26₂) a message resulting from performance of the reset procedure (104), the message including an element which collectively indicates that a subset of the connections are to be released, the element being recognizable when included in a further message
10 received over an air interface by a user equipment unit having a connection in the subset whereby the user equipment unit can determine if it is to return to the idle mode; and
using the further message so that the user equipment units (30) involved in the subset of the connections can return to an idle mode.

- 15
15 16. The method of claim 15, further comprising:
performing at the serving control node (26₁) plural processes with each of the plural processes handling a respective one of plural subsets of connections with user equipment units (30) in the connected mode;

- 20 when the reset procedure (104) affects a specific one of the plural processes, including in the message an element corresponding to the respective one of the plural subsets of connections handled by the specific one of the plural processes.

17. The method of claim 15, further comprising sending, from the at least one drift control node (26₂), a response message to the serving control node (26₁).

- 25 18. The method of claim 15, further comprising:
sending from the at least one drift control node (26₂) the further message to the user equipment unit via a base station (28) controlled by the at least one drift control node (26₂);
including in the further message a further element, the further element being derived from the element included in the message.

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30 19. A message transmitted from a node (26₁ or 26₂) of a radio access network of a telecommunications system to at least one other node of the radio access network, the

message resulting from occurrence of a reset procedure (104) affecting a control node which controls connections with user equipment units (30) in a connected mode, the message including an element which collectively indicates that a subset of the connections are to be released so that the user equipment units (30) involved in the subset of the connections can return to an idle mode, the element being recognizable when included in a further message received over an air interface by a user equipment unit having a connection in the subset whereby the user equipment unit can determine if it is to return to the idle mode.